



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
75 Hawthorne Street  
San Francisco, CA 94105

MEMORANDUM

**SUBJECT:** FIVE-YEAR REVIEW FOR SYNERTEK NO. 1 SITE

**FROM:** John Kemmerer, Acting Chief  
Site Cleanup Branch

**TO:** Keith Takata, Director  
Superfund Division

I. INTRODUCTION

Attached, please find a copy of the Synertek No. 1 Five Year Review prepared by the California Regional Water Quality Control Board. EPA has reviewed their Five Year Review and adopts their recommendations as written. The Regional Board's Five Year Review is summarized below.

Upon reaching ROD goals, contaminant levels will allow for unlimited use and unrestricted exposure. Therefore, this Five-Year Review is not required by the statute (section 121 (c) of CERCLA, as amended) or Section 300.430(f)(4)(ii) of the NCP, which implements CERCLA. Because clean-up will take five or more years to attain, this Type I Five-Year Review is required and must be conducted as a matter of Agency policy (OSWER Directive 9355.7-02, "Structure and Components of Five-Year Reviews", 5/31/91, p.2). This review is applicable to a site at which construction is complete (OSWER Directive 9355.7-02A, "Supplemental Five-Year Review Guidance", 7/26/94, p.4-5).

II. FIVE-YEAR REVIEW SUMMARY

The Synertek Building 1 site was listed on the NPL in October 1989. In 1983, the source was found to be leakage from an underground solvent storage tank and three neutralization tanks. Synertek began interim clean-up measures that year until 1991. These interim measures included removing the tanks and installing a groundwater extraction and treatment system. The main contaminants of concern were TCE and TCA, and the contaminants spread to the 'A-zone' and 'B-zone' aquifers. A Remedial Investigation / Baseline Public Health Evaluation (RI/BPHE) and Feasibility Study (FS) were completed by the discharger in 1990. In March 1991, the final cleanup plan and standards were adopted from Order No. 91-051. In accordance with the Site Cleanup Requirements (SCR), full-scale reinjection of treated groundwater into the 'B-zone' was underway in December 1991. Complications with clogging in the injection system led to its termination following the discharger's request in 1993. Soils contaminated with VOCs in excess of 1 part per million have been removed.

Since the SCR, ARARs changed for five compounds which are not essential to cleanup procedures and should not impact the current remedy. Over 45 million gallons of groundwater has been extracted at the site. Removal of 64 pounds of VOCs since 1991 has effectively contained the plume and reduced VOC concentrations by about 72 percent. The discharger predicts that, within a few years, VOC levels will approach asymptotic levels, and the system will have a less significant impact. Cleanup standards may not be attainable.

The discharger is found to be within full compliance and implementation of the approved remedial action plan and all current Board Orders. The Board generally agrees with the discharger's characterization of the site and recommends continued operation of the treatment system with a modified monitoring and reporting program.

### III. CONCLUSION

The response actions as selected in the ROD remain effective at protecting human health and the environment (OSWER Directive 9355.7-02, Attachment I, p.2).

Future Policy Five Year Reviews shall be conducted every five years from the approval of the previous Review, until ROD cleanup levels are achieved, assuming they will remain at levels that allow for unlimited use and unrestricted exposure (OSWER Directive 9355.7-02, Attachment I, p.5). Therefore, the next Five Year Review shall be written five years from the signature date of this Review.

Approved by:

Keith Takata

**Keith Takata, Director  
Superfund Division  
Region IX**

Date: 10-31-98

Attachment: Review Comments on Synertek Building 1 Facility, 3050 Coronado Blvd in Santa Clara, Five Year Status Report and Effectiveness Evaluation

cc: Synertek 1 Site File

**CALIFORNIA REGIONAL WATER QUALITY CONTROL  
SAN FRANCISCO BAY REGION**

**Toxics Cleanup Division**

**Five-Year Review (Type I)**

**Synertek No. 1  
3050 Coronado Drive  
Santa Clara, California**

**I. INTRODUCTION**

**Authority Statement. Purpose.** The California Regional Water Quality Control Board, San Francisco Bay Region, conducted this review pursuant to the Multi-Site Cooperative Agreement (MSCA) between the U.S. EPA Region IX and the Regional Board, and the U.S. EPA Supplemental Five-Year Review Guidance (OSWER Directive 9355.7-02A) of July 26, 1994. It is a policy review. The purpose of a five-year review is to ensure that a remedial action remains protective of public health and the environment and is functioning as designed. This document will become a part of the Site File (No. 2189.8135). This review (Type I) is applicable to a site which response is ongoing.

**Site Characteristics:**

**Location.** The Synertek No. 1 Facility is located on Coronado Drive about a block from where it intersects Central Expressway in the City of Santa Clara. The predominant groundwater flow direction is towards the north-northeast. The underlying sediments are a heterogeneous alluvial material consisting of sands and gravels interbedded with silts and clays. Three aquifer zones have been identified and are designated the A-zone, B-zone and B1-zone. Groundwater is first encountered at approximately 10 feet below the surface in sand and silty sand deposits which make up the A-zone aquifer. The B-zone aquifer is generally encountered from 30 to 50 feet below the surface and is separated from the A-zone aquifer by a 10 foot thick sandy and silty clay aquitard. The B1-zone aquifer was encountered between 100 and 108 feet below the surface and is separated from the B-zone aquifer by an approximately 60 foot thick clay aquitard. Groundwater in the A-zone flows to the north and B-zone groundwater flows to the northeast. A deep regional aquifer which supplies drinking water for the Santa Clara Valley underlies the site and is separated from the B1 aquifer by a 63 foot thick clay aquitard. VOC pollution from Synertek has impacted the A-zone and B-zone aquifers. VOCs have not been detected in the B1-zone.

**Source of Contamination.** The Synertek No. 1 Facility was used for semiconductor manufacturing from 1974 until 1985. The facility had a 200 gallon underground storage tank, used for storing solvents, and three neutralization tanks. The solvents stored in the tank were primarily TCE and TCA. Leakage from the underground tank and neutralization tanks is responsible for groundwater pollution at

the site.

**Maximum Contamination.** The historical maximum VOC concentrations in the A zone were 2788 ug/l total VOCs. Contamination has been highest in the B-zone with maximum concentrations of TCE - 33,000 ug/l and 1,1,1-TCA - 25,000 ug/l. As of the fourth quarter 1995, maximum total VOC concentrations in the A-zone were 219 ug/l and in the B-zone 4800 ug/l.

## II. DISCUSSION OF REMEDIAL OBJECTIVES

### Remedial Actions:

**Groundwater.** Investigation and remediation efforts at the site have been ongoing since 1983. The solvent tank and neutralization tanks were removed in 1985. Groundwater extraction and treatment began in 1987 with pumping from two A-zone extraction wells and one B-zone extraction well. Currently, there are four A-zone and two B-zone extraction wells in use. There are 25 A-zone and eight B-zone groundwater monitoring wells at the site.

In 1990 the discharger performed a Remedial Investigation/Baseline Public Health Evaluation (RI/BPHE) and a Feasibility Study (FS). The feasibility study evaluated different remedial action alternatives. A complete description of the alternatives is contained in the November 1990 FS report. The Regional Board adopted Site Cleanup Requirements (SCRs), Order No. 91-051, for the site in March 1991. The alternative that was selected in the SCRs as the final cleanup plan consisted of: 1) a deed restriction prohibiting the use of shallow groundwater, 2) groundwater monitoring, 3) groundwater pumping from the A-zone and the B-zone, 4) treatment of extracted groundwater with air stripping and discharge of the treated groundwater to the storm drain under an NPDES permit, 5) proposal and implementation of a groundwater reinjection project.

The SCRs set cleanup standards at California proposed or adopted Maximum Contaminant Levels (MCLs), EPA MCLs, California Action Levels, or a level based on a risk assessment. These cleanup levels are:

Chemical	Final Cleanup Standard (ug/l)
acetone	1,200
benzene	1
2-ethylhexyl	4
cis-1,2-DCE	6
ethylbenzene	680
styrene	5

Chemical	Final Cleanup Standard (ug/l)
toluene	100
xylene	175
TCE	5
TCA	200
DCA	5
DCE	6
TDCE	not established
freon 113	1,200
vinyl chloride	0.5

The discharger installed a groundwater injection system in accordance with the SCRs to reinject treated extracted groundwater onsite. Preliminary results from tests of the injection well installed in April 1991 indicated that groundwater injection into the B-zone aquifer was feasible. Full scale reinjection of treated groundwater into the B-zone was implemented in December 1991. Problems with clogging of the injection system due to the hardness of the water resulted in frequent downtime. Addition of a pretreatment system to reduce the hardness of the water was of limited success and in January 1993 the discharger requested that the injection program be terminated. The Regional Board concurred with the discharger that groundwater reinjection at the site was impractical and the injection program was terminated.

**Soils.** Soils beneath and adjacent to the solvent tank and neutralization tanks which were impacted with VOCs were removed. Sampling results indicated that soils containing VOCs in excess of 1 part per million (ppm) were removed.

### III. ARARs REVIEW

The discharger conducted a review of the chemical specific Applicable Relevant and Appropriate Requirements (ARARs) for the compounds for which final cleanup standards were adopted. These ARARs are drinking water standards for 11 of the 14 compounds. Five of the ARARs have changed since the SCRs were adopted. The following summarizes these changes:

Acetone:	From 1,200 ug/l to 610 ug/l
bis(2-ethylhexyl)phthalate:	From 4 ug/l to 4.8 ug/l
ethylbenzene:	From 680 ug/l to 700 ug/l
Styrene:	From 5 ug/l to 100 ug/l
Toluene:	From 100 ug/l to 150 ug/l

Currently the cleanup is being driven by TCE, DCE and DCA, for which ARARs remain the same. Hence, the change in ARARs for the above five compounds should not effect the cleanup.

#### **IV. EFFECTIVENESS EVALUATION**

**Discharger's Evaluation.** The 5-year status report is the discharger's evaluation of the selected final cleanup remedy and cleanup costs. This report also contains an evaluation by the discharger, if drinking water standards have not been achieved, addressing whether it is technically feasible to achieve drinking water quality on-site.

**Effectiveness of Site Remediation.** Soil contaminated with greater than 1 ppm of VOCs has been excavated and removed. There is currently believed to be no source contributing additional VOC mass to the groundwater. Over 45 million gallons of groundwater has been extracted at the site. Since 1991 when the final SCRs were adopted, 64 pounds of VOCs have been removed. VOC concentrations in extracted groundwater have been reduced from 371 parts per billion (ppb) in January 1991 to about 102 ppb, a reduction of about 72 percent. The mass removal rate of the extraction system has declined somewhat but is still relatively constant, indicating that the system remains effective at removing VOCs from groundwater. It was originally estimated that cleanup standards would be met after approximately 25 years of operating the remediation system. Based on the past 5 years of operating data, the discharger predicts that the system will remain effective for a few more years but that VOC levels will begin to reach asymptotic levels and removal of VOCs may no longer result in significantly reducing VOC concentrations in groundwater.

The cleanup plan has worked in that groundwater extraction has reduced the VOC concentrations in groundwater at the site and has prevented further migration of the plume. However, it is possible that due to the limitations of groundwater extraction as a means of removing VOCs from groundwater, cleanup standards may not be achieved.

**Cost Evaluation.** The estimated costs for final remedial measures were originally estimated to be \$61,000 per year. The net present value in 1990 for a 25-year period of operating the remedial measures was \$895,000, using a 5 percent discount rate. For the period covered by the five year review, total operating costs were \$1,706,546. This includes costs that were not in the original estimate such as the reinjection program, agency reimbursement costs, and major repairs to the system. Groundwater monitoring and system maintenance costs have proven to be substantially above the costs originally estimated for these tasks.

Assuming an annual cost of \$200,000 and a discount rate of 5

percent, the discharger estimates the net present value of operating the system for another 20 years is \$2,492,000.

#### **V. SUMMARY OF SITE VISIT**

The most recent site visit occurred in June 1995, when a compliance inspection was conducted by a member of the Board's Staff. The inspection did not reveal any violations, and the site was found to be in full compliance.

#### **VI. AREAS OF NONCOMPLIANCE**

The discharger has fully implemented the approved remedial action plan, consistent with the remedial objectives, and is in compliance with all current Board Orders as modified by the elimination of the requirement for groundwater reinjection.

#### **VII. RECOMMENDATIONS**

In general Board Staff agrees with the discharger's characterization of the site in the 5-year Review. Staff recommends continued operation of the groundwater extraction and treatment system. The discharger has recommended that the monitoring and reporting program be reduced from quarterly to biannually. Board Staff agrees that this is acceptable due to the large amount of data already collected which indicates that biannual sampling is sufficient to adequately track the plume and the progress of the remediation effort.

#### **VIII. STATEMENT OF PROTECTIVENESS**

We certify that the remedy selected for this site remains protective of human health and the environment.

#### **IX. NEXT FIVE-YEAR REVIEW**

The next 5-year review will be conducted by June 2001.